

REMARKSRegarding the Status of the Claims:

Claims 1, 5, 14, and 24 – 41 are pending.

Regarding the Claim Amendments presented in this reply:

The amendments to the claims do not add new matter. Polyether ketones, polyether ether ketones, and polyether ketone ketones have been deleted from the Markush group specifying the high-temperature-resistant thermoplastic of claim 1.

Regarding the Restriction Requirement:

The Office action maintains the restriction requirement, arguing that applicants have not traversed “on the grounds that the claimed species are not patentably distinct...”¹ Applicants are not obligated to traverse on these grounds, because the restriction requirement was improper, and was traversed on other grounds (*See* the Reply under 37 C.F.R. §1.143 filed in response to the Office action mailed July 12, 2007).

Regarding the Claim Rejections:

The Office action rejects:

- I. claims 1, 5, and 24 – 41 under 35 U.S.C §102(b) over US 6,045,899 to Wang et al. (hereinafter, “Wang”);
- II. claims 1, 5, 14, and 24 – 41 under 35 U.S.C §102(e) or 35 U.S.C §103(a) over US 7,045,082 to Deitzen et al., which corresponds to EP 1333051 (hereinafter, “Deitzen”); and
- III. claims 1, 5, 14, and 24 – 41 under 35 U.S.C §102(b) or 35 U.S.C §103(a) over US 5,084,484 to Nintz et al. (hereinafter “Nintz”).

¹ Page 4, line 19 - page 5, line 1 of the Office action mailed April 30, 2008

Regarding Rejection I:

Applicants respectfully submit that the rejection of claims 1, 5, and 24 – 41 under 35 U.S.C §102(b) over Wang should be withdrawn.

The claims are directed to a foam. Wang discloses a membrane. The Office action provides a dictionary definition of “foam,” which reads, “a material in a lightweight cellular form resulting from introduction of gas bubbles during manufacture.”² The Wang membrane does not meet this definition, because the membrane does not result from introduction of gas bubbles during manufacture. To the contrary, according to Wang at column 5, line 65 – column 6, line 7,

The first step of the method is to provide a casting dope with between about 9% and 12% by weight of a sulfone polymer and between about 3% and 15% by weight of a hydrophilic polymer, dissolved in a solvent. The dope is next cast to form a thin film. The thin film is exposed to a gaseous environment, including water vapor at a relative humidity of between about 50% and 80% for between about 2 seconds and 20 seconds. The film is then coagulated in a water bath having a temperature between about 20°C and 70°C. Finally, the membrane is recovered from the water bath.

The Wang process does not involve introduction of gas bubbles. Thus, based on the dictionary definition of “foam” provided in the Office action, Wang’s membrane is not a foam.

The Office action provides a second, unsupported definition for “foam.” The Office action states, “generally, in the art of polymer foams, the ‘foam’ is nothing more than a cellular material...”³ Thus, the Office action has effectively taken Official Notice with regard to the definition of the term, “foam.”

Applicants respectfully traverse this Official Notice Statement. MPEP §2144.03 states, “Official notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known.”

² Page 5, lines 11 – 12 of the Office action mailed April 30, 2008.

³ Page 5, lines 12 – 13 of the Office action mailed April 30, 2008.

Moreover, “[i]f notice is taken, the basis for such reasoning must be set forth explicitly. The examiner must provide specific factual findings predicated on sound technical and scientific reasoning to support his or her conclusion of common knowledge.”⁴ The Office action fails to meet this standard. No specific factual findings predicated on sound technical and scientific reasoning are presented to support the Official Notice statement that “generally, in the art of polymer foams, the ‘foam’ is nothing more than a cellular material....”⁵ Applicants request that the Official Notice statement be withdrawn. Alternatively, in accordance with the harshly-worded standard set forth in the case of *In re Chevenard*, 139 F.2d 711, 713, 60 USPQ 239, 241 (CCPA 1943), Applicants respectfully “demand [that] the examiner ... produce authority” for the Official Notice Statements. According to the case of *In re Zurko*, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001), “[The examiner] must point to some concrete evidence in the record in support of these findings.”

Moreover, the specification, at page 1, lines 9 – 14, provides a definition of the term, “foam.” Thus, applicants respectfully submit that no reason exists to resort to alternative and/or unsupported definitions. “Where an explicit definition is provided by the applicant for a term, that definition will control interpretation of the term as it is used in the claim.” MPEP §2111.01, citing *Toro Co. v. White Consolidated Industries Inc.*, 199 F.3d 1295, 1301, 53 USPQ2d 1065, 1069 (Fed. Cir. 1999).

The Office action inappropriately refuses to accept applicants’ definition of the term, “foam.” More specifically, at page 5, lines 13 – 17, the Office action states,

the examiner simply can not agree with the applicants interpretation of the term ‘foam’ as necessarily having cells distributed across their entire bulk or ‘which have an envelope density lower than that of the structural substance,’ whatever this means and whatever is meant by ‘envelope density’ and ‘structural substance.’

Again, it is inappropriate, as explained in MPEP §2111.01 not to accept an explicit definition provided by the applicant. Additionally, applicants respectfully submit

⁴ MPEP §2144.03, citing *In re Soli*, 317 F.2d 941, 946, 137 USPQ 797, 801 (CCPA 1963); and *In re Chevenard*, 139 F.2d 711, 713, 60 USPQ 239, 241 (CCPA 1943).

⁵ Page 5, lines 12 – 13 of the Office action mailed April 30, 2008.

that the meaning of the questioned terms would be readily apparent, to a person of ordinary skill in the art. For example, US 2007/0141322 A1 at paragraph [0016] explains,

... the term ‘foam material’ refers, in particular, to materials having preferably open cells or pores distributed over their entire mass and having a bulk density which is lower than that of the framework or foam substance. Both organic polymers (e.g. foam plastics) and inorganic materials (e.g. foam glass, foam metals, etc.) can function as framework substance.

US 2007/0141322 A1 uses the term, “framework substance,” while the present specification uses the term, “structural substance.” Similarly, US 2007/0141322 A1 uses the term, “bulk density” while the present specification uses the term, “envelope density.” Again, it is respectfully submitted that the meaning of the questioned terms would be readily apparent, to a person of ordinary skill in the art.

The definition of “envelope density” is also apparent from the following references. US 7,1829,961 to Batycky et al., at column 3, lines 22 – 28, explains,

... the term ‘envelope density’ refers to the ratio of the mass of a particle to the sum of the volumes of the solid in each piece and the voids within each piece, that is, within close-fitting imaginary envelopes completely surrounding each piece. In other words, envelope density refers to the ratio of the mass of a particle to the envelope volume of the particle.

US 5,608,157 to Orr et al., at Column 1, lines 23 – 29, explains,

[t]he volume of an object can be determined by either excluding the volume of the holes and the pores to find its absolute density (also termed the true or skeletal density) or including the holes and pores up to the point at which they break the plane of the surface to determine the envelope density (also called the bulk or apparent density).

US 5,608,157 to Orr et al., at Column 1, lines 42 – 51, further explains,

[t]he envelope density of an object is valuable when used in conjunction with its absolute density to determine the porosity of that object and its specific pore volume (i.e., the

pore space that was eliminated upon compression):

$$\text{Porosity} = [(1 - \text{Envelope Density} / \text{Absolute Density}) 100]\%$$

$$\text{Pore Volume} = [1 / \text{Envelope Density} - 1 / \text{Absolute Density}] \text{cm}^3/\text{g}$$

Porosity and pore volume are parameters that frequently establish the fitness of an object for its intended purpose.

At any rate, independent claim 1 is directed to a foam, having an open-cell structure, wherein the open-cell factor for the foam is at least 75%. The Wang membrane is not disclosed as having an open-cell structure. The Wang membrane is not disclosed as having an open-cell factor of at least 75%. The Office action asserts that these required features “can be ascertained with particularity from the figures of Wang....”⁶ However, the Office action does not ascertain these features from the figures of Wang at all, let alone with particularity. Moreover, the Office action provides no explanation as to how these features can be ascertained. Thus, once again, the Office action has taken Official Notice. Specifically, the Office action has taken Official Notice that an open-cell factor can be ascertained with particularity from an electron micrograph of a membrane.

As required, Applicants respectfully traverse this Official Notice Statement. MPEP §2144.03 states, “Official notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known.” Moreover, “[i]f notice is taken, the basis for such reasoning must be set forth explicitly. The examiner must provide specific factual findings predicated on sound technical and scientific reasoning to support his or her conclusion of common knowledge.”⁷ The Office action fails to meet this standard. No specific factual findings predicated on sound technical and scientific reasoning are presented to support the Official Notice assertion that an open-cell factor can be ascertained with particularity from an electron micrograph of a membrane. Applicants request that the Official Notice assertion be withdrawn. Alternatively, in accordance with the standard set forth in the case of *In re Chevenard*, 139 F.2d 711, 713, 60 USPQ 239, 241 (CCPA 1943),

⁶ Page 5, line 22 – page 6, line 1 of the Office action mailed April 30, 2008.

⁷ MPEP §2144.03, citing *In re Soli*, 317 F.2d 941, 946, 137 USPQ 797, 801 (CCPA 1963); and *In re Chevenard*, 139 F.2d 711, 713, 60 USPQ 239, 241 (CCPA 1943).

Applicants respectfully “demand [that] the examiner ... produce authority” for the Official Notice Statements. According to the case of *In re Zurko*, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001), “[The examiner] must point to some concrete evidence in the record in support of these findings.”

Wang does not disclose a foam. Wang discloses a membrane. The Wang membrane does not meet applicants’ definition of a foam. The Wang membrane does not meet the dictionary definition of “foam” provided in the Office action. The second definition of “foam” provided in the Office action is not supported by concrete evidence in the record. Both definitions provided in the Office action are inappropriate because applicants have already defined the term, “foam.” Wang does not disclose a foam having an open-cell structure, wherein the open-cell factor for the foam is at least 75%, and wherein the foam has a cell-size of from 50 to 2000 μm , as required by present claim 1. The Office action’s assertion that these required features “can be ascertained with particularity from the figures of Wang...”⁸ is not supported by concrete evidence in the record. For at least these reasons, applicants respectfully submit that the claims are not anticipated by Wang. Favorable action is requested.

Regarding Rejection II:

Applicants respectfully submit that the rejection of claims 1, 5, 14, and 24 – 41 under 35 U.S.C §102(e) or 35 U.S.C §103(a) over Deitzen should be withdrawn.

The Office action acknowledges that the reference does not disclose the cell size, the open cell content, or extrudability, but the Office action maintains that the Deitzen process necessarily results in a foam with the claimed characteristics. The Office action asserts that the Deitzen process “conditions are substantially similar to the conditions used in the illustrative examples of the present specification....”⁹

To the contrary, the temperatures used in example 1 of Dietzen for foaming polyether sulfone are selected to obtain a foam comprising mainly closed cells. To illustrate this point, it is useful to compare the temperatures used in Dietzen to foam

⁸ Page 5, line 22 – page 6, line 1 of the Office action mailed April 30, 2008.

⁹ Page 6, lines 11 – 13 of the Office action mailed April 30, 2008.

polyether sulfone with the temperatures used in the present specification to obtain a foam according to the present invention, i.e., a polyether sulfone foam having an open-cell structure, wherein the open-cell factor for the foam is at least 75%. Page 13, lines 20 to 30 of the present specification provide the details of three experiments conducted with polyether sulfone 3010E from BASF. The results are represented below:

Exp. No.	H ₂ O (%)	Acetone (%)	Talc (%)	T (°C)	Thickness (mm)	Density (g/l)	Open-cell factor (%)
1*	1.2	4	0.1	249.1	30	43	6
2	1.2	4	0.1	258.3	25	53	78
3	1.8	4	0.1	259.2	28	46	93

* Experiment 1 is non-inventive, since the melt temperature selected here during foaming was one at which a closed-cell foam is produced (temperature difference between experiment 1 and experiments 2 and 3 approximately 10°C).

As can be seen from experiment 1, at foaming temperatures of 249.1°C, a closed cell-foam is produced from polyether sulfone E3010 from BASF. Only at higher temperatures, is a foam according the present invention produced from the polyether sulfone, i.e., a polyether sulfone foam having an open-cell structure, wherein the open-cell factor for the foam is at least 75%.

The temperature ranges utilized in example 1 of Dietzen for foaming polyether sulfone E2010 from BASF are from 243.8°C to 250°C. On page 3, lines 6 – 10, the Office action asserts,

[i]t is reasonable to assume that the processing temperatures at which the closed (and open) cell structures are formed are lower for lower molecular weight polymers than higher molecular weight polymers as the tension properties of heated polymers of lower and higher viscosity are different.

To the contrary, as expressed by Dr. Dietrich Scherzer in the enclosed Expert Declaration under 37 C.F.R. §1.132, the temperature behavior of the two polyethersulfones used in Dietzen (ULTRASON®), respectively used in example 1 of the present invention (polyethersulfone 3010 E) show a comparable temperature behavior. Since the foaming temperatures in example 1 of Dietzen are not sufficiently high to obtain foams having a

high open-cell factor, Dietzen does not disclose foams having an open-cell factor of at least 75%.

Regarding Rejection III:

Applicants respectfully submit that the rejection of claims 1, 5, 14, and 24 – 41 under 35 U.S.C §102(b) or 35 U.S.C §103(a) over Nintz should be withdrawn. Nintz relates to foams based on aromatic polyether ketones. Applicants respectfully traverse this rejection for the reasons already on record; however, this rejection is moot in light of the amendment to claim 1.

In Conclusion:

The present application is in condition for allowance. Applicants request favorable action in this matter. In order to facilitate the resolution of any issues or questions presented by this paper, the Examiner is welcome to contact the undersigned by phone to further the discussion.

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Enclosure (1): Declaration under 37 C.F.R. §1.132.